

FR-2457185 X  
us-4308110

clms  
112

09/889957  
JC18 Rec'd PCT/PTO 25 JUL 2001  
Patent  
Attorney's Docket No. 004900-200

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of )  
Jacques BOURDON et al. ) Group Art Unit: Unassigned  
Application No.: Unassigned ) Examiner: Unassigned  
(Corresponds to PCT/FR00/00166 )  
International Filing Date: 25 January 2000 )  
For: METHOD AND INSTALLATION OR )  
SEPARATING AND PURIFYING )  
DIPHENOLS IN THE PHENOL AND )  
PHENOL DERIVATIVES INDUSTRY )

PRELIMINARY AMENDMENT

BOX PCT  
Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-captioned application as follows:

IN THE CLAIMS:

Kindly amend the claims as follows:

Kindly replace claims 1-11 and 13-20 as follows.

1. (Amended) A process for separation and purification of a crude mixture comprising hydroquinone and resorcinol, optionally tars, and optionally catechol, in which process the crude mixture is first subjected to a series of distillation stages comprising:
  - (i) optionally distilling in stage (I) [designed] to produce catechol as a distillation top product,
  - (ii) obtaining the distillation bottom product from (i) or the crude mixture in the absence of stage (I) to a distillation stage (II) designed to produce, as

91  
distillation top product, a resorcinol-rich fraction comprising resorcinol and hydroquinone,

- (iii) subjecting the distillation bottom product obtained from (ii) to a distillation stage (III) designed to produce, as a distillation top product, a hydroquinone-rich fraction comprising hydroquinone and resorcinol,

and then subjecting the hydroquinone-rich fraction and/or the resorcinol-rich fraction to a refining stage (IV or V) in order to extract the hydroquinone and/or the resorcinol, respectively.

2. (Amended) The process as claimed in claim 1, wherein stage (I), when it is present, or stage (II) is preceded by at least one preliminary detarring stage (1, 1') designed to produce, as a bottom product, a tar-rich fraction and, as a top product, a detarred fraction which is used to feed stage (I) or stage (II).

3. (Amended) The process as claimed in claim 2, wherein two predistillation stages (1, 1') are provided, the tar-rich bottom fraction from the first (1) being used to feed the second (1') and the two detarred top fractions being used to feed stage (I) or (II).

4. (Amended) The process as claimed in claim 1, wherein stage (II) is designed to result in a resorcinol-rich fraction comprising:

- from 75 to 95 % resorcinol, and
- from 5 to 25 % hydroquinone.

5. (Amended) The process as claimed in claim 1, wherein stage (III) is designed to result in a hydroquinone-rich fraction comprising:
- from 75 to 98% hydroquinone, and
  - from 2 to 25% resorcinol.
6. (Amended) The process as claimed in claim 1, wherein the refining of the rich fractions is carried out on drainers.
7. (Amended) The process as claimed in claim 1, wherein the distillation column (I) has the following specifications:
- number of theoretical stages: from 5 to 40; and
  - reflux ratio R of between 1 and 10.
8. (Amended) The process as claimed in claim 1, wherein the distillation column (II) has the following specifications:
- number of theoretical stages: from 10 to 85; and
  - reflux ratio R of between 1 and 35.
9. (Amended) The process as claimed in claim 1, wherein the distillation column (III) is a scraped falling film device or a distillation column having the following specifications:

- number of theoretical stages: from 1 to 10, and
- reflux ratio R of between 0.5 and 5.

10. (Amended) The process as claimed in claim 1, wherein the detarring column or columns (1, 1') is/are scraped falling film devices.

11. (Amended) The process as claimed in claim 1, wherein the crude mixture comprises, with respect to the total mixture:

- from 20 to 60% by weight of hydroquinone,
- from 2 to 20% by weight of resorcinol,
- from 0 to 20% by weight of catechol, and
- the remainder being formed of various compounds comprising tars.

13. (Amended) The plant as claimed in claim 12, which additionally comprises:

- a detarring column (1) designed to produce, at the column top, a detarred fraction and, at the bottom of the column, a tar-rich fraction
- optionally at least one other distillation column (11) fed with the tar-rich fraction originating from the preceding column (1) and designed to produce, at the column top, a detarred fraction and, at the bottom, a tar-rich fraction,

the top fraction or fractions of these columns being used to feed column (I) or (II).

Ar

- from 75 to 95% resorcinol, and
- from 5 to 25% hydroquinone.

- from 75 to 98% hydroquinone, and
- from 2 to 25% resorcinol.

16. (Amended) The plant as claimed in claim 12, wherein the refining device or

- number of theoretical stages: from 5 to 40; and
- reflux ratio  $R$  of between 1 and 10.

- number of theoretical stages: from 10 to 85[, preferably from 15 to 40; and

ratio R of between 1 and 35.

Application No. Unassigned  
Attorney's Docket No. 004900-200

19. (Amended) The plant as claimed in claim 12, wherein the distillation column (III) is a scraped falling film device or a distillation column having the following specifications:

- number of theoretical stages: from 1 to 10, and
- reflux ratio R of between 0.5 and 5.

20. (Amended) The plant as claimed in claim 12, wherein the detarring column or columns (1, 1') is/are scraped falling film devices.

**REMARKS**

Entry of the foregoing amendments are respectfully requested.

Should the Examiner have any questions concerning the subject application, a telephone call to the undersigned would be appreciated.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By: 

Teresa Stanek Rea  
Registration No. 30,427

P.O. Box 1404  
Alexandria, Virginia 22313-1404  
(703) 836-6620

Date: July 25, 2001